CLAIMS

What is claimed as the invention is:

1 A method of obtaining genetically altered primate pluripotent stem (pPS) cells or progeny thereof, comprising:

a) providing a composition of pPS cells essentially free of feeder cells; and

b) transferring a polynucleotide into pPS cells in the composition.

2. The method of claim 1, further comprising preferentially selecting cells that have been genetically altered with the polynucleotide.

3. The method of claim 1, wherein the hPS cells are cultured in an environment comprising extracellular matrix components and a conditioned medium produced by collecting medium from a culture of feeder cells.

4. A method of producing genetically altered primate pluripotent stem (pPS) cells or progeny thereof, comprising:

a) providing a composition of pPS cells on a layer of feeder cells that are drug-resistant;

b) transferring a polynucleotide into pPS cells in the composition; and

c) selecting genetically altered cells in the composition using the drug to which the feeder cells are resistant.

5. The method of claim 1, wherein the polynucleotide comprises a protein encoding region operably linked to a promoter that promotes transcription of the encoding region in an undifferentiated pPS cell.

6. The method of claim 1, wherein the polynucleotide is selected from the group consisting of an adenoviral vector, a retroviral vector, and a DNA plasmid complexed with positively charged lipid.

7. The method of claim 1, wherein the pPS cells are human embryonic stem (hES) cells.

8 An undifferentiated human pluripotent stem (hPS) cell genetically altered with a polynucleotide.

9. A stably transfected undifferentiated human pluripotent stem cell.

10. A population of primate pluripotent stem (pPS) cells, in which at least 25% of the undifferentiated pPS cells have been transfected with a polynucleotide, or are the progeny of such cells that have inherited the polynucleotide.

11. A population of genetically altered differentiated cells, obtained by differentiating the cells of claim 10.

12. The composition of claim 8, wherein the pPS cells are human embryonic stem (hES) cells.